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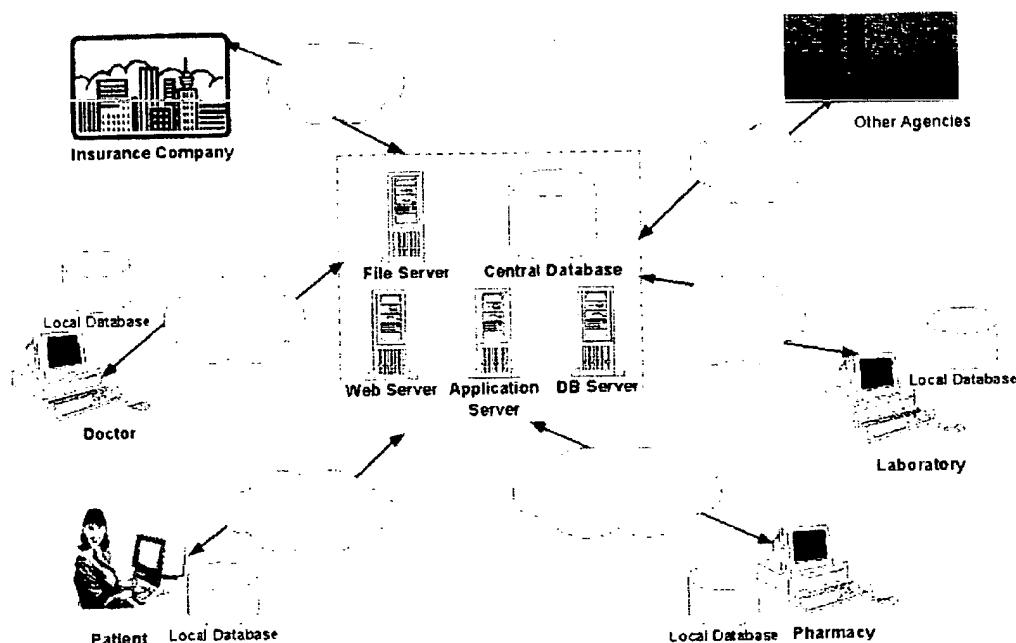
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(54) Titre : SYSTEME DE TRANSMISSION, DE TRAITEMENT ET DE PROTECTION (Y COMPRIS LE CONTROLE D'ACCES) DE DONNEES MEDICALES AXE SUR INTERNET

(54) Title: INTERNET BASED MEDICAL DATA HANDLING, PROCESSING, SECURING AND PROVIDING CONTROLLED ACCESS



(57) Abrégé/Abstract:

This invention globally connects all medical service providers and patients, stores real time data of patients securely, and provides access with appropriate authorization from the patient. Dual mode feature can handle patients who may or may not be willing to keep their data outside of their medical service provider's office. This invention allows patients to schedule online appointments with doctors, laboratories etc., check their medical history and access other online services. Doctors can access and update their patient's data from anywhere provided they have Internet access. Doctors can write electronic prescriptions and requisitions, receive test results online etc. This system enables pharmacies to receive and dispense online electronic prescriptions. Laboratories can receive requisitions and submit the results online. The inventory control module helps them to maintain proper levels of inventory. This invention enables all the users to receive and pay their bills online as well as raise bills electronically.



## **Abstract**

This invention globally connects all medical service providers and patients, stores real time data of patients securely, and provides access with appropriate authorization from the patient. Dual mode feature can handle patients who may or may not be willing to keep their data outside of their medical service provider's office.

This invention allows patients to schedule online appointments with doctors, laboratories etc., check their medical history and access other online services.

Doctors can access and update their patient's data from anywhere provided they have Internet access. Doctors can write electronic prescriptions and requisitions, receive test results online etc.

This system enables pharmacies to receive and dispense online electronic prescriptions. Laboratories can receive requisitions and submit the results online. The inventory control module helps them to maintain proper levels of inventory.

This invention enables all the users to receive and pay their bills online as well as raise bills electronically.

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## **Description**

### **INTERNET BASED MEDICAL DATA HANDLING, PROCESSING, SECURING AND PROVIDING CONTROLLED ACCESS**

This invention brings all the different entities in the medical world to a common platform using the power of Internet.

## **Background**

In the present world most of the data related to patients, whatsoever it may be, is exchanged in the form of paper copies between various medical service providers such as doctors, pharmacies, insurance companies etc. The main entity i.e. the patient always moves from place to place but the data related to him/her never moves along. Moreover patient has hardly any access or control over his own data, which is scattered, all over the places.

On the other hand, at present, the power of Internet is not being realized in really useful ways that can serve the humans and make their life easier and comfortable.

There always was a need to connect various services together in a way that we can use the same data across different organizations. One way this can become possible is if we keep a central record of all individuals and all the transactions related to these individuals. Accessing this central database by various service providers could now be easily done through Internet. Using Internet data can be easily transferred from all different nodes into central database and the other way around. However the biggest challenge remains is how medical service providers are going to handle patients that are not willing to keep any data related to them outside of their medical service provider's office. This is the point where dual mode mechanism of this system will help these service providers. Software will be provided to each medical service provider that will keep data in local database for patients that are not yet comfortable with Internet and for the others who are comfortable this

software will help to keep the local and central database in synchronization. All this will happen in background.

## **Terms Used**

### ***Medical Service Provider***

These are professionals providing medical services to patients e.g. doctors, laboratories, pharmacies, and insurance companies etc.

### ***Central Server***

Internet based Application Server that controls the access to central database and offers electronic services to medical service providers and patients.

### ***Enrolled Patient***

Patients for whom data will be stored in central database along with local database and they will be using online services provided by Central Server.

### ***Un-Enrolled Patient***

Patients for whom data will be stored in local database of their medical service providers and this data cannot be shared. Such patients would not be able to utilize any electronic service provided by Central Server.

### ***Cancellation period***

Some medical service providers allow to cancel the appointment only if it is cancelled before "X" days/hours of appointment time. After that the patient is still charged even if he/she does not show up. Those "X" days/hours are referred as cancellation period.

## **SUMMARY**

The fundamental principle that this invention is based upon is – any data related to a patient is converted to electronic format, and stored securely in the central / local database. This data in central database can be used by all the different entities of medical world with

permission from the patient i.e. the patient controls who should have access to his/her data. At present the major problems are

1. The people are not very comfortable with the idea of keeping the medical data related to them at any other place except their doctor's office.
2. The availability of any process that can help in the transition.

Most of the people find it very hard to accept the change as in this case they may not feel very comfortable with the idea of keeping data related to them in central database which will be outside of their doctor's office. But when the people are properly educated about the benefits of storing data electronically, securely and at central place, as this data can be used by anyone over and over again and they can control directly the access permissions, everyone will start accepting the change. At present the patients do not even have proper access to the medical data related to them and with this system, for the first time, they will have direct control over it. Until they become comfortable their data will be stored in local database of medical service providers but in proper format so that it can be transferred to the central database with the click of a button. As the patients will start becoming comfortable and enrolling for online services their data can be transferred to the central database and herein after kept in synchronization with data in the local database. But why still keep the data of those patients in local database, who are comfortable with Internet, and the data is already in central database. There are at least two known advantages of having data in local database

1. In case the central server is down no one is affected and the medical service providers will keep working as if nothing has happened. Until the central server is down all the data in the local database will be marked and will be uploaded to the central database once the central server comes up.
2. The central server will not be overloaded with too many requests. All the operations will access data from the local database and only the data to be updated in the central database will be sent to the central server as one transaction.

## Detailed Description

The product automates the services provided to patients by various medical services providers such as doctors, laboratories, pharmacies, and insurance companies.

In order to become a valid user of this system, all the users would have to enroll and configure themselves. This configuration would allow each one of them to use the services provided by the system to work according to their environments and patient's preferences.

Once the user is enrolled and configuration is complete, the product is ready to be used.

## Doctor's Configuration Setup

Before doctor can start using the software or patients can start accessing services such as appointment scheduling etc the setup has to be completed. Explained below are the few setups needed

### *1. Necessary Data For Enabling Self Scheduling Service*

Doctor will need to enter the normal office hours and any time during normal office hours when office will be closed such as lunch breaks etc. At any time now or later doctor can add out of normal schedule times when office will be closed or open. Doctor will need to enter the frequency of appointments i.e. the approximate time for each appointment. This information will be compiled to show schedule calendar to the online patients. Doctor's office will be using the same for offline patients.

Any open slot can be closed/blocked anytime. If some patient had already scheduled an appointment for the slot being closed now, then he/she will be informed through email or other means as per his preference settings.

## *2. Default Pharmacies List*

Doctor can add a few pharmacies to the default pharmacy list. The pharmacies can be added or deleted in the default list on ongoing basis. This list will be used if the patient wants his/her request to be redirected to a certain pharmacy.

## *3. Default Laboratories List*

Doctor can also add a few laboratories, with which they deal more frequently to the default laboratory list. The laboratories can be added or deleted in the default list on ongoing basis. Most of the requisitions will be sent to the laboratories that are in this default list.

## *4. Default Insurance Companies List*

Doctor can add the insurance companies to the default list. This list will be used when doctor needs to bill these insurance companies.

## *5. General Preferences Setup*

Preference setup can include things such as default prescription printing, default lab requisition printing, session expiry (after how long the session should expire) etc.

# **Description of Doctor Functions**

## *1. General Functions*

All the general functions such as adding new patients, inserting/modifying/deleting patient data, and search etc. will be available. If patient selects to use online services during enrollment, the patient will be flagged to be an enrolled patient. Any data entered related to medical condition or treatment given to an enrolled patient can be modified

only by the person who originally entered it, however patient or doctor can modify patient's personal information.

## 2. *Prescribing Medicines*

Doctors would be able to send prescriptions online to pharmacies that are already online and using electronic services.

Any patient would have an option either to print their prescription or not based on their preference. If a printed prescription is issued to a patient, the prescription record will be marked as printed. An online pharmacy will collect the printed prescription before issuing medicines on such a prescription. Pharmacy will be able to recognize it through the system and in no case will dispense the medicine if the printed prescription is not submitted.

By default each prescription will be open-ended i.e. the patient can go to any pharmacy. Any online pharmacy will be able to access this prescription once the patient goes to pick up the medicine. Upon patient's request the prescription can be directed to a specific pharmacy too. The main advantage of directing patient prescription to a specified pharmacy is that the pharmacy will receive an alert right away and they will get everything ready even before the patient reaches there.

System will have the capability of blocking/stopping a prescription once issued as long as it has not been dispensed by the Pharmacy. The advantage this invention has over the traditional prescription system is that this invention helps protecting the false duplication of prescription. A paper prescription can always be copied/duplicated where as an electronic prescription is not easy to be duplicated.

## 3. *Filling Requisitions*

While filling requisitions, doctors would be able to send these requests online to laboratories that are already online and using electronic services.



Any patient would have an option to either request printed requisitions or not based on their preference. If a printed requisition is issued to a patient, the patient requisition request record will be marked as printed. An online medical service provider will collect the printed requisition before providing service on such a requisition. These service providers would be able to recognize it through the system and in no case will provide the service if the printed requisition is not submitted.

By default each requisition will be closed-ended i.e. the patient will need to go to the specified laboratory. Upon patient request the requisition can be left open-ended.

Laboratories will post the results online.

#### *4. Communicating Test Reports*

Whenever patient's results arrive, doctor will mark those with different status. Based on the nature of the results, different statuses will be available. Once the doctor assigns a status to the results, system will send an email to the enrolled patients advising them to have a look at their results. Patient will also be informed in the same email if they have been referred to any specialist or the doctor wants to see them again and in this case they will need to schedule an appointment with the specialist or the doctor as mentioned in email. They can always schedule the appointment online by just clicking on the link received in the email. For each different status the confirmation time has to be set by the doctor and this is the time within which the patient should confirm the receipt of email. Once this time has passed without getting confirmation from patient about the receipt of email, an alert message will be sent to doctor's office so that the patient can be informed by other means i.e. by phone or letter.

For un-enrolled patients results have to be communicated manually and appointments will be scheduled by the doctor's office, as they will have no access to online scheduling.

### *5. Billing Insurance Companies*

Insurance companies can be billed online. Upon receipt of the reimbursement charges from insurance company, a complete tracking will be maintained and the balance amount would be billed online to patient, which they will be able to pay online.

### *6. Checking Patient Requests*

These requests may be related to many different subjects such as online request for repeats, issuing some kind of certificate, sending report to insurance companies, change of address etc. All these requests will be part of the system.

### *7. Checking Other Requests*

Doctor will check other requests that may have come from insurance companies, health departments, pharmacies etc. After checking the requests system allows to send replies.

### *8. Submitting Reports To Insurance Companies*

Doctor will upload all the reports with the help of central server and these will be placed into secure folders allocated to each insurance company and they will be able to download at any time after providing proper authentication. So in essence this invention will provide an electronic information transfer system for bulk data also to the doctors and other medical service providers. When the doctor submits report, patient will be informed automatically if it is setup to do so.

### *9. Issuing Certificates As Requested By Patients*

Doctor will be able to send electronically signed certificates to the patients which in turn they can submit to anyone or on request doctor can submit directly.

## 10. *Various Other Functions*

Doctor will be able to perform many other functions online through this system e.g. order supplies and equipment, receive and pay bills online.

## **Patient Configuration Setup**

### 1. *Setup Default Doctor List*

The patients will be able to search for their doctor and can add a doctor to their default doctors list. This list will include family physician, dentist or any other doctor frequently visited by the patient. This list will be displayed when the patient comes to schedule appointments.

### 2. *Setup Default Pharmacies*

The patient would be able to setup default pharmacies and these will be those pharmacies with which he/she frequently deals. This list will be displayed to doctor while issuing prescription to the patient and only used if patient wants to redirect prescription to a specific pharmacy in the list.

### 3. *Setup Other Preferences*

The patient may like to setup some default preferences such as

- Reminder for appointments i.e. how long before a scheduled appointment patient should receive an alert/email.
- Alert type depending on the kind of event e.g. may like a normal email or text message when new test results come in and patient may like text message on his/her pager for appointment alerts.
- Setup if he/she will like to receive promotional material etc
- Other available setup options.

## Main Services for patients

### 1. Setup Appointment With Doctor

The patient will search for a doctor or choose from the default list. The search can be done based on one or combination of fields like last name, first name, zip code, and phone etc. If the patient wants to search based on Medical Center/Hospital name, then the schedule for all the doctors in that medical center/hospital will be accessible. In the search results all the doctors that matched the search criteria will be listed. For each doctor the other details that will be listed are the doctor's specialty, appointment cancellation period and any other details from which the patients can benefit. Once the doctor has been selected, the schedule calendar for that doctor will be presented to the patient. An example is shown below

**Dr. ABC**

◀ **March 2001** ▶

<input checked="" type="checkbox"/> Office Closed <input type="checkbox"/> No Appointments Available <input type="checkbox"/> Appointments Available						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
(Closed)	9 AM - 5 PM	9 AM - 5 PM	9 AM - 5 PM	9 AM - 5 PM	9 AM - 5 PM	9 AM - 1 PM
			1	2	3	4
	6	7	8	9	10	11
	13	14		16	17	18
	20	21	22	23	24	25
	27	28	29	30	31	

In the next step the patient selects the proper date by navigating using the navigation controls provided. Once the date is selected, the patient is presented with that day's schedule as shown below. Once the patient has selected the doctor, the day and time, patient will be asked to confirm the selection. Upon confirmation, appointment is listed in doctors calendar and also patients personal calendar. An alert will be sent to the patient 'X' days before the scheduled date and this 'X' days is determined by using his/her setup.

## 21 March, 2001

<input checked="" type="checkbox"/> Appointment Taken	<input type="checkbox"/> Appointment Available
Time	Dr. Abc
09:00 - 09:30	
09:30 - 10:00	
10:00 - 10:30	
10:30 - 11:00	
11:00 - 11:30	
11:30 - 12:00	Lunch
12:00 - 12:30	Break
12:30 - 13:00	
13:00 - 13:30	
13:30 - 14:00	
14:00 - 14:30	
14:30 - 15:00	
15:00 - 15:30	
15:30 - 16:00	
16:00 - 16:30	
16:30 - 17:00	

The patient can cancel the scheduled appointment at any time if it falls within the valid cancellation period. Once the appointment has been successfully cancelled it will be taken out from both the patient and doctors calendar. Now the doctor's calendar will be showing this slot as available.

## *2. Check Appointments*

Patient can check for all his scheduled appointments at any time. The scheduled appointments could be downloaded so that it can be imported into any other program.

## *3. Check Tests Results*

Once the doctor releases the results, patient can view them. Once the patient marks those results as viewed they will be moved to the medical history. Patient may need to schedule an appointment with the doctor, if advised so by the Doctor.

## *4. Check Available Medicine Repeats*

Patient can check if there are any repeats still available for all of his medicines.

## *5. Send Request To Doctor*

Patients can send requests to doctors and these requests can be address change or some sort of medical certificate request.

## *6. Check Immunization History*

Immunization history will be purposely kept separate so that it can be easily printed or submitted directly to any organization that requires it, such as schools.

## *7. Check Medical History*

Patients can look at their medical history in chronological order.

## *8. Check Prescription History*

Patients can look at their prescription history in chronological order.

### ***9. Pay Their Bills Online***

Patients will be able to pay online, schedule one time payment or recurring payments using debit or credit payment method i.e. directly from their bank account, debit or credit card. The patient will be informed by email etc if the payment is declined.

### ***10. Send and Receive Mail***

Patients will be encouraged to use this email since it will be more secured and reliable. Service providers can send emails to patients using this internal email. Patient will also be able to use this facility for internal as well as external use.

### ***11. Join Communities, Chat And Post Messages***

Patients can join communities related to their health problems such as cancer community, heart disease etc, join online chat and post messages for help.

### ***12. Maintain Medical History In Local Database***

Patients can maintain their medical history in their local database by using the software provided to them. This software is optional and only needed in case the patients want to maintain their medical history and want to keep up-to-date synchronization with the central database.

## **Pharmacy Configuration Setup**

### ***1. Pharmacy Timings & Other Information***

Pharmacy can setup the timings of the pharmacy so that it can be shown to the patient/doctor. This timing will also be used in search criteria if anyone is trying to find open pharmacies at a certain time. Pharmacies open 24 hours can just click 'Open 24

hours' button and will not need to enter any time. However, the off time slots or days can be entered at any time.

## *2. Insurance Companies List*

Pharmacy can add the insurance companies to the default list. Insurance companies can be billed online.

## **Main Services for Pharmacies**

These are those items that pharmacy staff will be doing everyday. Some of them are listed below

### *1. Filling Prescriptions/Dispensing Medicine*

Pharmacy staff will check the status of prescription. If the status shows that a receipt has been printed then the medicine will not be issued without collecting printed receipt.

The pharmacy staff enters the patient id and submits the request. The data related to the patient is retrieved and presented on the system/screen. All the available prescriptions that can be dispensed are shown with check boxes. Pharmacy staff selects the prescriptions to be dispensed and enters the quantity, expiry date etc. The system will display the price and it will be broken into two parts – medicine price and dispensing fee, any of which could be modified if required. While dispensing medicine, local software provided to pharmacy will check the inventory data to make sure that the medicine that is being dispensed is from the batch that has the earliest expiry date. This will help dispensing medicines on a FIFO basis (i.e. First in – First out) and minimize the cost associated with expired medicine.

If it is to be charged to the insurance company then the details are entered on the same screen. On submitting, the transaction is sent to central server, which in turn can send to insurance company for approval using different channels such as modem or over the



Internet. Central server returns the details such as amount approved etc. The portion of medicine that was dispensed is moved to medicine history of the patient and reduced from the inventory of the pharmacy. Any balance amount that was not covered by the insurance company can be paid online using credit card, bankcard etc. or moved to patient's account, if pharmacy gives such an option. Patient can pay all or part of his dues online at any time.

For un-enrolled patients the only difference is that all the data related to the patient and prescription repeats etc are all stored in the local database of pharmacy. Next time when the patient comes in to get the repeats the local software will check with the central server if any cancellations of prescriptions exist otherwise it will show the available repeats from the local database.

## *2. Updating Stock at Pharmacy*

Pharmacy staff will add the new received medicines or medical equipment to the local database by scanning. Expiry date should be scanned too. If the product does not already exist in the database then the pharmacy staff will need to add the item and enter the price too.

## *3. Printing List of expired medicines and updating inventory data*

System will generate an alert if it finds that there are some expired medicines at the end of each day. The system will provide facility to print such a report for next "X" days i.e. items expiring in next "X" days. All the medicines in the list are physically removed from the pharmacy and marked as expired in the database too.

## *4. Online Ordering*

Pharmacies will be able to collect online orders. If pharmacy wants to offer online shopping to its customers, then real time data will be presented to pharmacy customers. In this case data will always be updated both in local and central database simultaneously. Pharmacy customers will be able to search online and order. This really

helps people as for some things it is easier for them to order online and pickup their order e.g. many research studies have shown that people feel shy/uncomfortable to buy some things like condoms or other sex related products in presence of other people.

## **Insurance Company Configuration Setup**

### *1. Online Prescription Reimbursement Requests Setup*

Insurance company will need to setup the mode of accepting online prescription reimbursement requests. The different modes can be using modem or Internet. If modem is to be used then the parameters like phone number, data bits, parity, stop bits etc need to be defined. If Internet is to be used then URL, encryption method etc need to be setup.

### *2. Groups and Users*

Insurance company will need to setup few groups and users depending on the functionality allowed to its Customer Service Reps.

## **Services for Insurance Companies**

### *1. On-line Authorization Requests*

While patient receives medical services, authorization will be given by the appropriate insurance company based on the appropriate parameters. Various factors determine whether a patient can receive a medical services or not depending on whether the insurance company/health plan or the health department covers the expenses.

## 2. Payment

The invention will allow insurance companies to pay respective medical service provider online. Medical service providers will generate bills on line. Upon receipt of bills, insurance companies will pay online using the payment processing services provided by this product.

## **Claims**

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR  
PREVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

A global patient care system comprising:

1. Global electronic network of patients, doctors and other paramedical services such as laboratories and pharmacies.
2. Globally identifying the patient and allowing appropriate access to authorized user using preferences set by the patient.
3. Globally accessible medical history of plural patients from any place, any device that has access to Internet, and at any time.
4. Global medical history further includes: means for examining said patient's prior medical history by authorized doctors.

A dual mode patient care system comprising

1. System, which works as stand-alone when installed on any medical service provider computer and is not connected to Internet.
2. System, which works as part of the network when installed on any medical service provider computer and is connected to Internet.
3. System, which is smart enough to keep synchronized data in local and central databases for enrolled users, and keeps data only in local database for un-enrolled users.
4. System, which can be accessed by all the users from anywhere, anytime, and using any device that has access to Internet.

An electronic prescription system comprising:

1. System in which the prescription can be sent electronically to any pharmacy and which is dispensed by the pharmacy approached by the patient.
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2. This system allows patient to pick up medicine from any pharmacy that is convenient to him without the need to carry prescription slip.
3. This system prevents fraud by blocking the electronic prescription once issued by a pharmacy. This system never allows the false duplication of prescription.
4. System that issues alerts and warnings if conflicting medicine is being dispensed.
5. A system that issues warning if any medicine being dispensed has an expiry date later than the identical medicine sitting on the shelf.

An electronic requisition issuing system comprising:

1. Identifying and rendering service to the patient as per the electronic requisition.
2. System that delivers the test results electronically to the doctor.
3. System, that enables the doctor to mark the results with different statuses and based on these inform the patient of action they need to take and deliver them their test results electronically.

A system that provides electronic searchable database means

1. System that enables the patients to do an electronic search using a predefined criteria by them in order to find the medical service provider.
2. System that provides various kinds of search like an exact search, partial match search, sounds like search.
3. System that even enables the patients to do the search based on Medical Center/Hospital name and lists all the available doctors in selected Medical Center/Hospital along with their specialties and other details.

An electronic appointment self-scheduling system comprising:

1. Electronic appointment self-scheduling means scheduling appointments by plural patients with medical service providers from the available appointments, which are, updated real time.
  2. System that enables the plural patients to review their appointments at any time and provides the ability to cancel if they need to do so.
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3. System that sends alerts and warnings to plural patients using appropriate method like email or phone (by automatically converting text to voice) regarding their upcoming appointments or any notices regarding the cancellation of their appointment by the medical service provider.

**An online authorization & billing system**

1. System which obtains online authorization from insurance companies for medical service providers such as pharmacies and laboratories
2. System that can track bill amount, authorization, and maintain account reconciliation.
3. System that enables medical service providers to raise bills online.
4. System that enables any user to pay against the bill raised by any other user of this system.
5. System that enables any user to pay back the adjustment amount to any other the other user of this system.

**An electronic messaging & document transfer system comprising**

1. System that sends messages, alerts, and warnings etc to other users of this system using appropriate means like email, phone (by automatically converting text to voice) etc.
  2. System that generates alerts as any event happens e.g. when test results arrive for doctor's review or when an email from a patient is there to look at.
  3. System that can securely transfer documents between various users by checking the authentication of sender and receiver.
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